

# Changes to the Shoreline of Fidalgo Bay and Eastern Guemes Channel Since 1891: The Value of a GIS Approach

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## Abstract

While it is widely recognized that efforts to industrialize the shoreline of the Georgia Basin and Puget Sound resulted in the loss of intertidal and subtidal habitat, the amount of this loss is rarely quantified. In this case study research project we examined historical changes to nearshore aquatic habitats in Fidalgo Bay and Eastern Guemes Channel since 1891. We found that while some regions within the study site remained relatively unchanged, other regions were highly modified. For example, the amount of fill along the northwest shoreline of Fidalgo Bay (~38 ha) equals 16.5% loss of intertidal and subtidal habitat since 1891 while only 2.3% of this habitat has been lost in the rest of Fidalgo Bay within the same time frame. Comprehensive data layer analysis in a geographic information system (GIS) format allowed us to:

1. Quantify changes to the shoreline and bathymetry since 1891.
2. Visualize these changes overlain on aerial photographs.
3. Estimate human impacts to intertidal and subtidal vegetation and forage fish spawning areas.

We will discuss the implications of our study as a guide for the restoration of Fidalgo Bay and Eastern Channel and as a template for other studies in the industrialized regions of Puget Sound Basin.